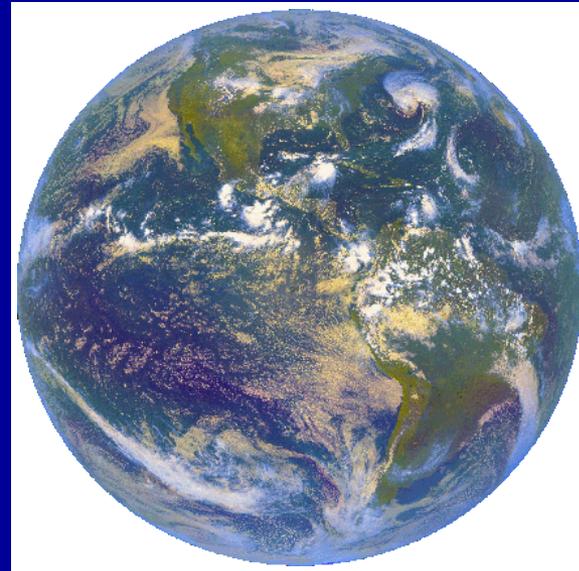
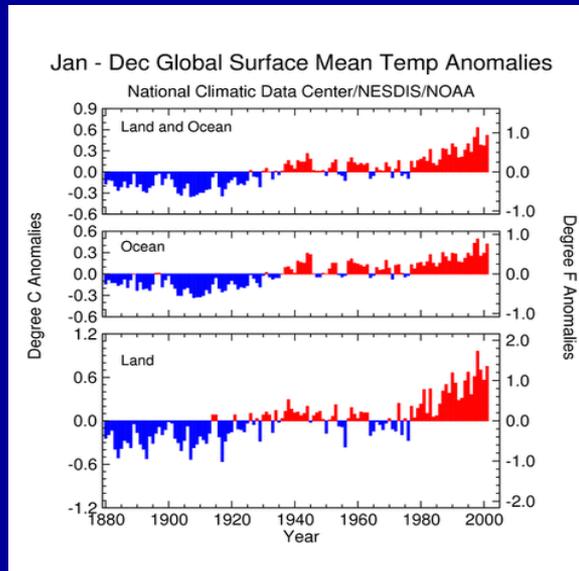




# Looking at the Future of NOAA's Satellite and Information Service



**Gregory W. Withee**  
**Assistant Administrator for**  
**Satellite and Information Services**

**Honoring the Heritage of NESDIS**  
**August 19, 2002**



# NOAA Serving The Nation





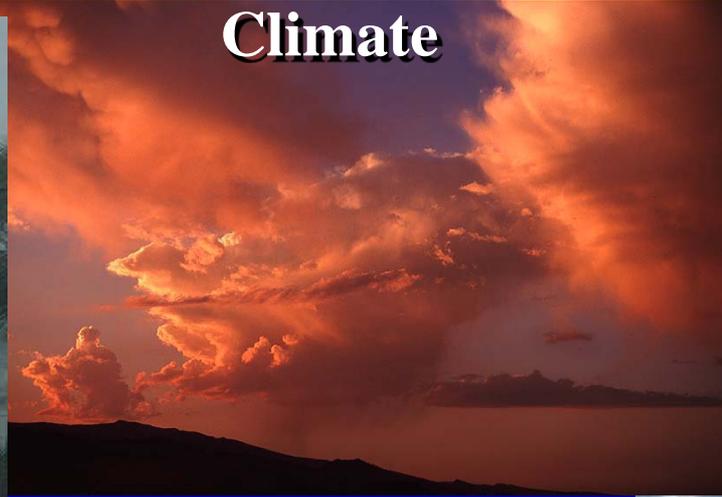
# NESDIS Data and Information are Essential for...



**Weather and Hazards**



**Climate**



**Oceans**



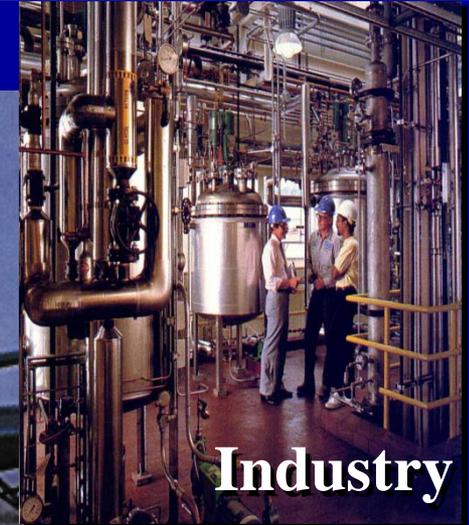
**Defense**



**Transportation**



**Industry**



**Agriculture**



# An End-to-End Responsibility



## Requirements & Planning



## Acquisition



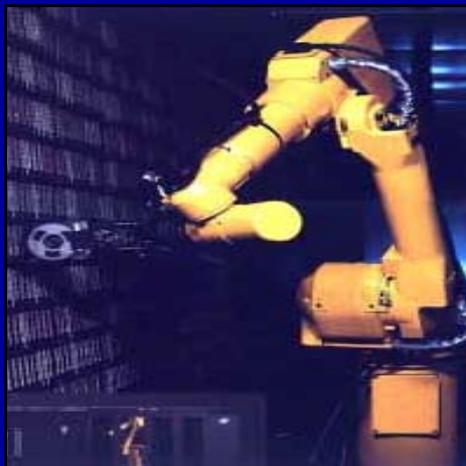
## Launch



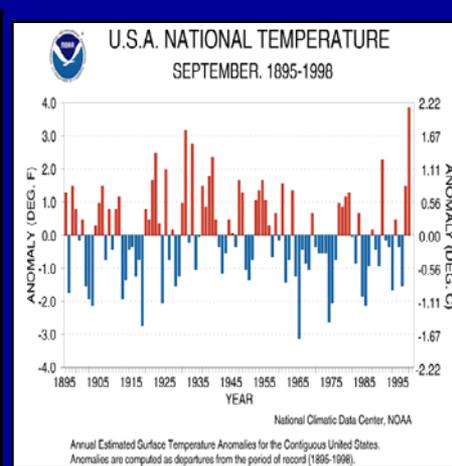
## Command and Control



## Real-Time Product Development



## Archive and Access

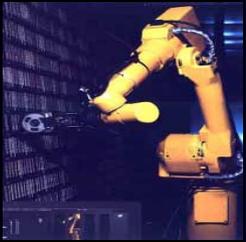


## Climate Assessments



## Users

# NESDIS Programs



- **Geostationary Operational Environmental Satellite (GOES)**
- **Polar-orbiting Operational Environmental Satellite (POES)**
- **National Polar-orbiting Operational Environmental Satellite System (NPOESS)**
- **Satellite Operational Services**
- **Environmental Data Management**
- **Applications Research and Development**



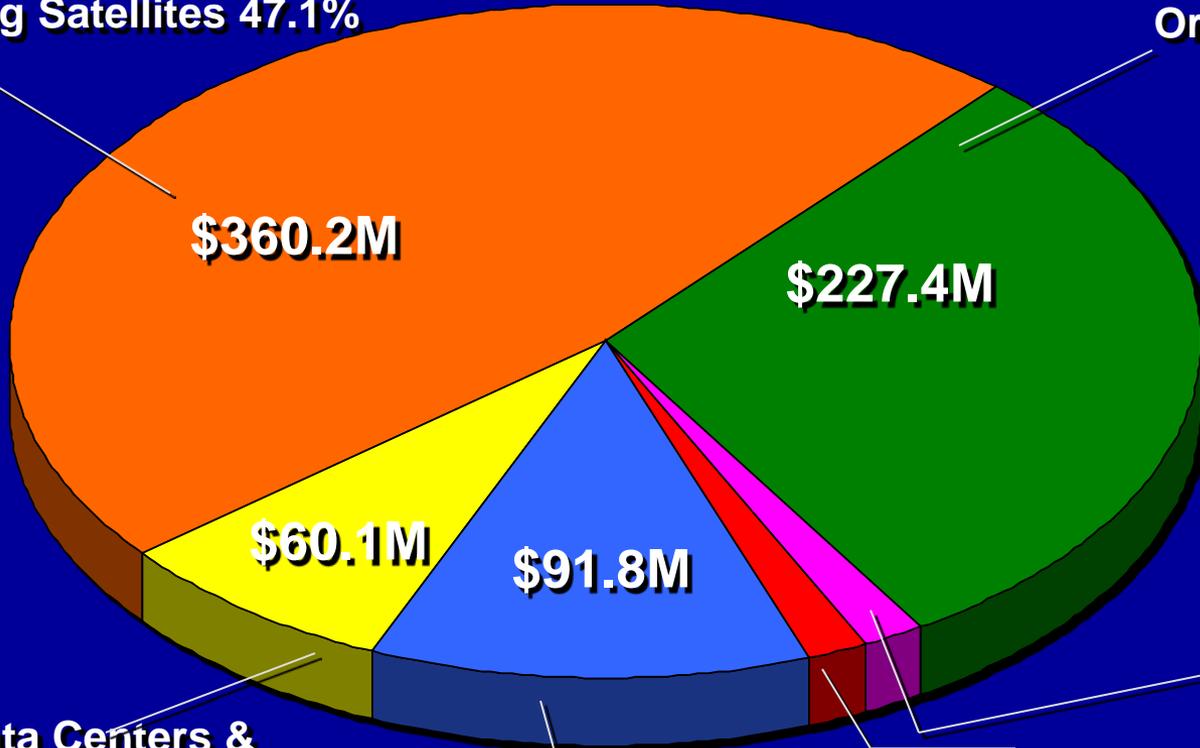
# NESDIS FY2003 Distribution of Funds by Major Program



**\$764.7 M**

**Polar Orbiting Satellites 47.1%**

Polar K-N<sup>I</sup>  
\$122.9M / 16.1%  
NPOESS  
\$237.3M / 31.0%



**Geostationary Orbiting Satellites 29.7%**

GOES I-M  
\$4,146 / 0.5%  
GOES N Series  
\$208,638 / 27.3%  
GOES R Series  
\$14,614 / 1.9%

**NOAA Data Centers & Information Services 7.9%**

**Environmental Satellite Observing Services 12.0%**

**Construction \$13.4M 1.8%**

**Other \$11.8M 1.5%**

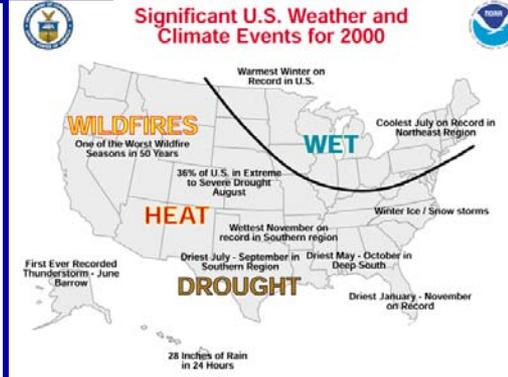
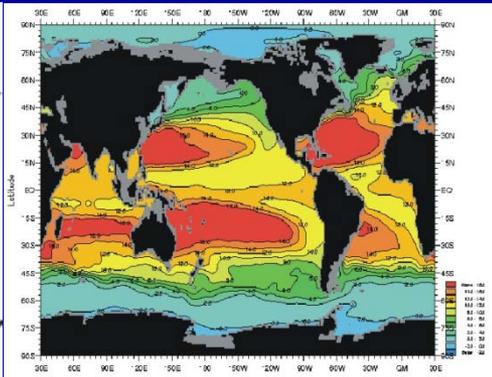
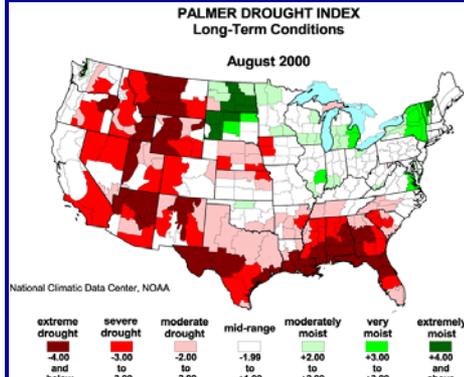
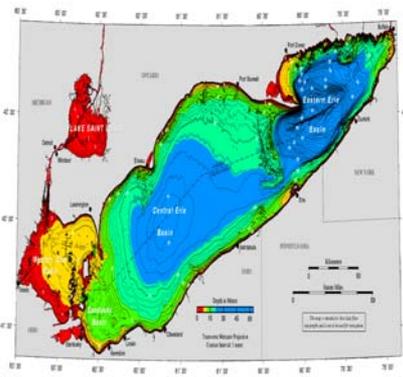
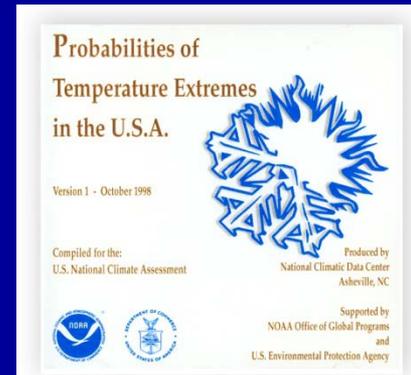
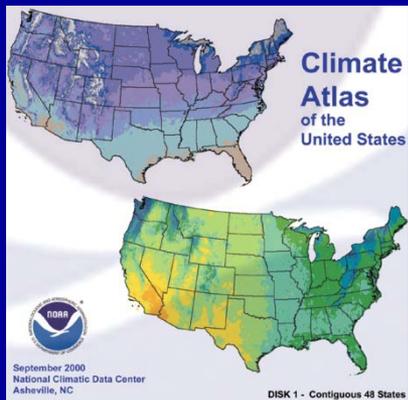




# NOAA's Environmental Information Service



NOAA, through the National Environmental Satellite, Data, and Information Service, operates the National Data Centers, including 7 World Data Centers, that provide long-term preservation, management and ready accessibility of environmental data..





# NOAA's Data System Capability



- **Manages 3 National Data Centers and 7 World Data Centers**
- **Archived over 1 petabyte of data in FY 2001**
- **Maintains some 1300 data bases containing over 400 environmental variables**
- **Maintains over**
  - **535,000 tapes**
  - **375, 000,000 film records**
  - **140,000,000 paper records**

# A View of NOAA Problems in 1990





# Challenges



- **Hard copy to electronic media**
- **Rapid ingest of observational data**
- **Rapid access to data**
- **High-speed media migration**
- **Reprocess large volumes**
- **Improve integration of environmental observation**

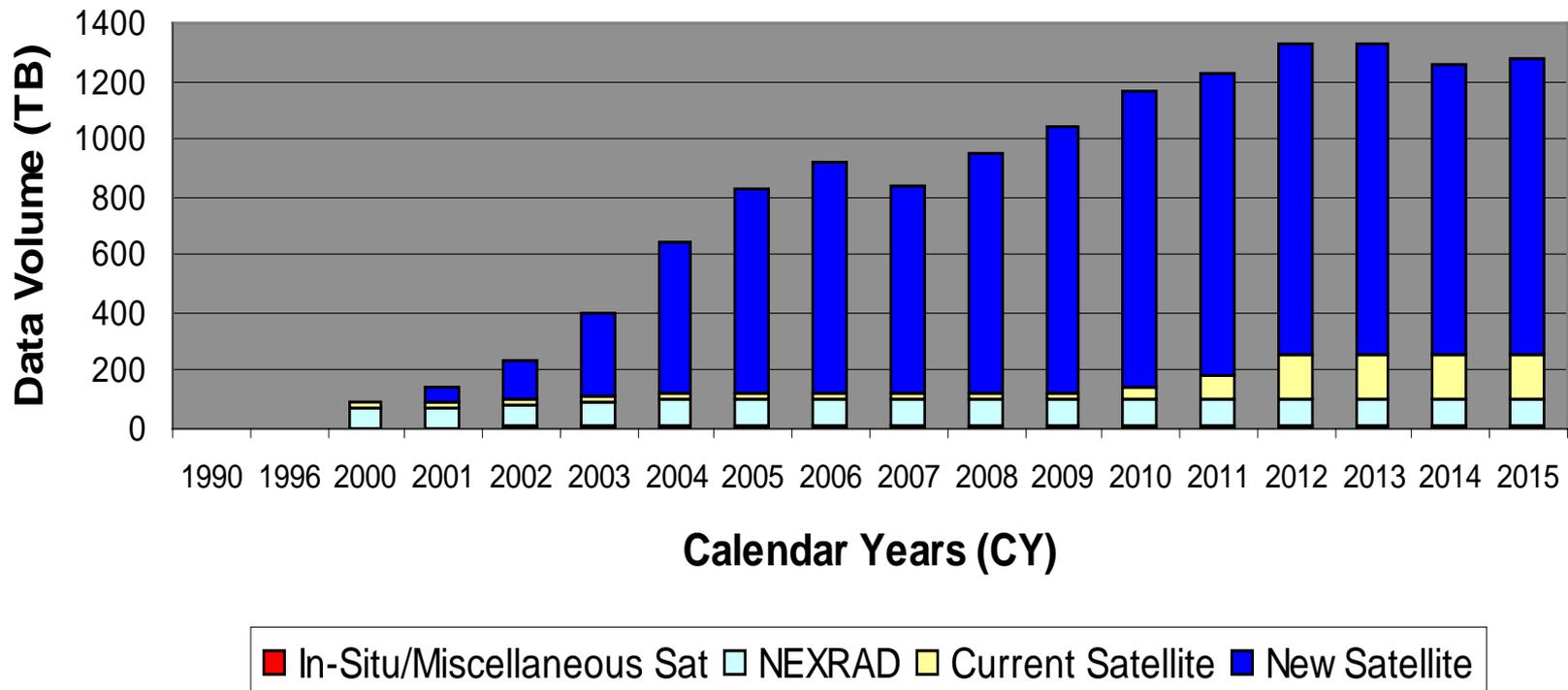


# Non-digital Data Archive(Paper)





# Projected Annual Data Ingest Volume (TB) NOAA National Data Centers (NNDC)

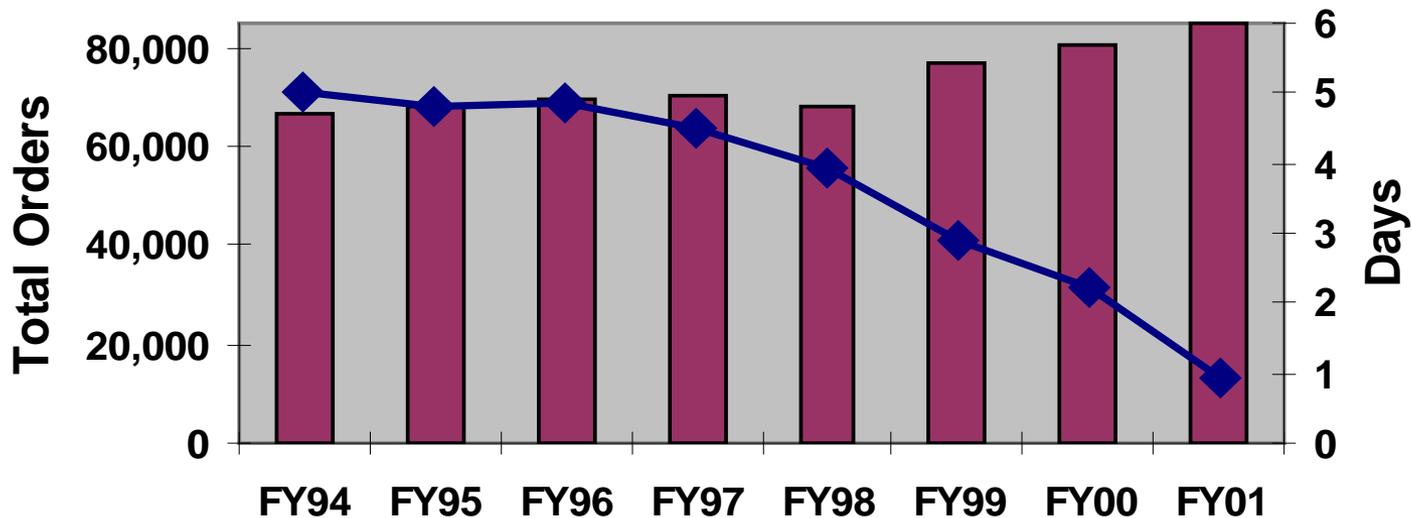




# Customer Service

## Improved Efficiency due to Web Access

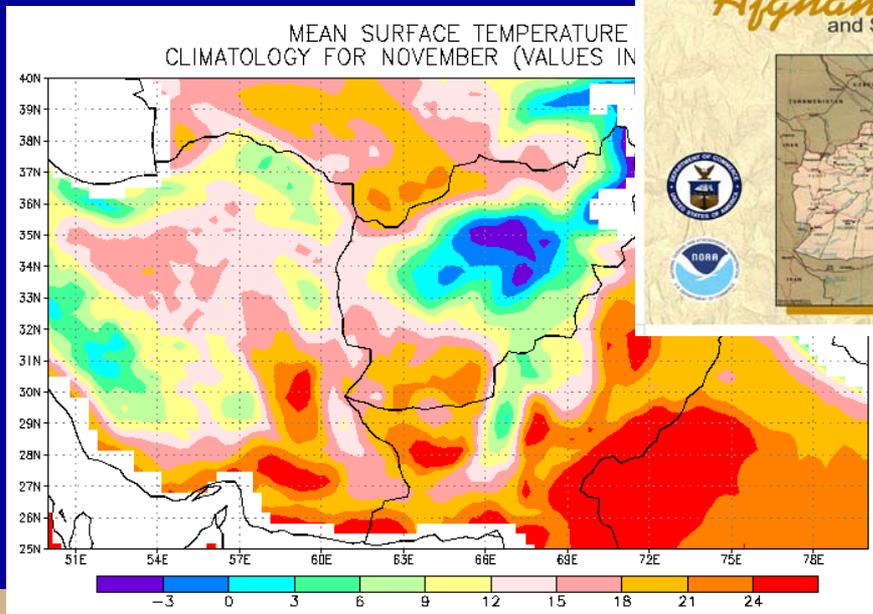
### Timeliness of Ordering NCDC Data (Includes Free Orders)



■ Total Orders ◆ Time: Order Entry to Customer Receipt



# Sample Products – National Environmental Satellite, Data, and Information Service



Climatology of *Afghanistan* and Surrounding Areas

<http://lwf.ncep.noaa.gov/oa/climate/research/afghan/afghan2.html>

displayed on the maps are generally from 1956 to 1983 data.

Options below and click on to display your selection.

- Mean Temperature
- Mean Maximum Temperature
- Record Maximum Temperature
- Mean Minimum Temperature
- Record Minimum Temperature
- Maximum Snow Depth
- Mean Relative Humidity
- Mean Hours of Sunshine
- Mean Days with Thunderstorms
- Mean Days with Snowfall
- Mean Rain Days
- Mean Precipitation



For larger view click [here](#).

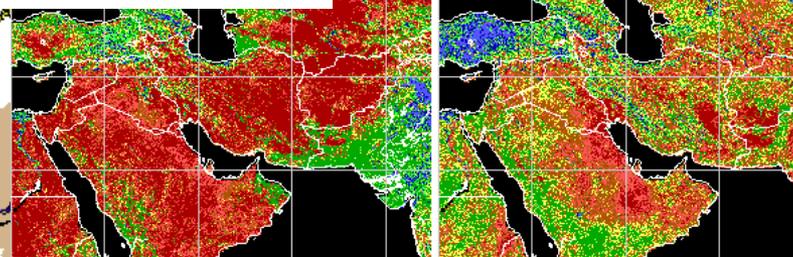
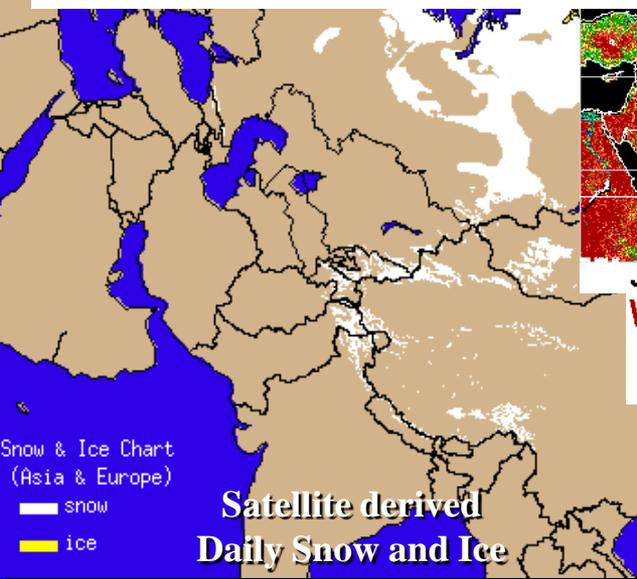
[Monitoring / Afghanistan / Map Selection / Search / Help](#)

<http://lwf.ncep.noaa.gov/oa/climate/research/afghan/afghan2.html>

10:21:06 EST

08:00:37 EDT by [Jay.Lawrimore@noaa.gov](mailto:Jay.Lawrimore@noaa.gov)

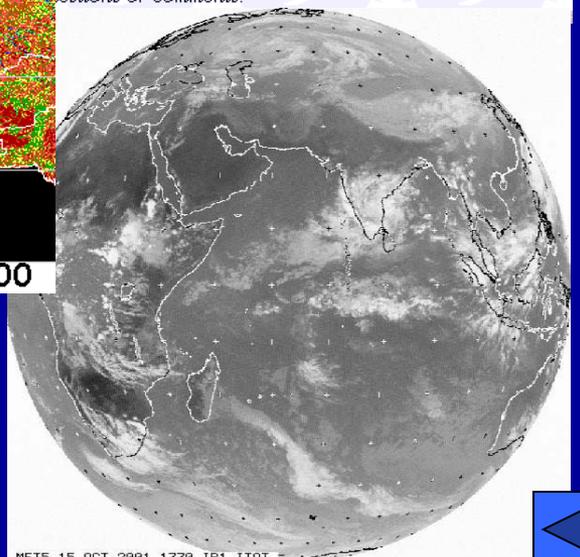
For questions or comments.



**VEGETATION HEALTH from NOAA-16**  
Central Asia

Stressed Fair Favorable

Snow 0 50 100

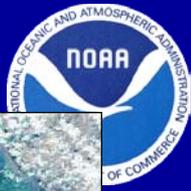


METEOSAT-5 data: Visible, infrared, water vapor bands. Data resolution is 5 km

METS 15 OCT 2001 1330 IR1 ITOT



# MODIS Data from NASA TERRA Satellite – Mississippi Delta





# National Climatic Data Center



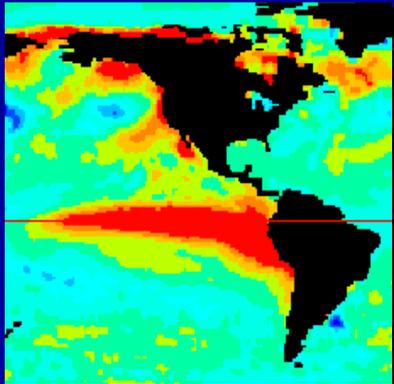


# NOAA's



# Operational Environmental Satellites

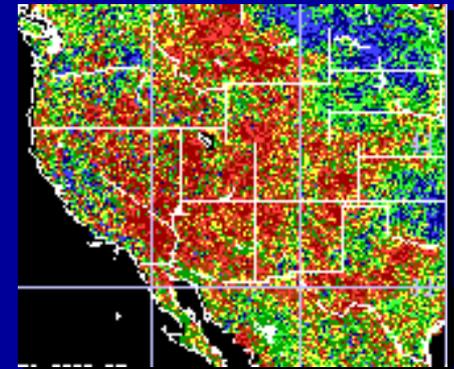
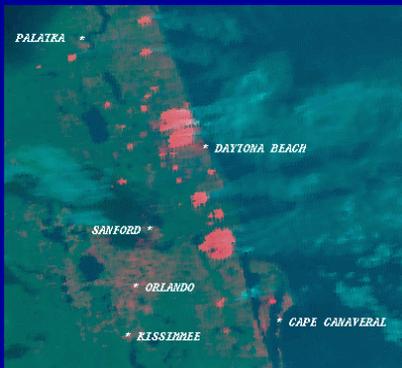
The National Environmental Satellite, Data, and Information Service provides an *OPERATIONAL* remote sensing capability for acquiring and disseminating *GLOBAL* and *REGIONAL* imagery and measurements of the environment, including



**METEOROLOGICAL**  
**CLIMATIC**  
**TERRESTRIAL**  
**OCEANOGRAPHIC**  
**SOLAR-GEOPHYSICAL**  
**HAZARDS**

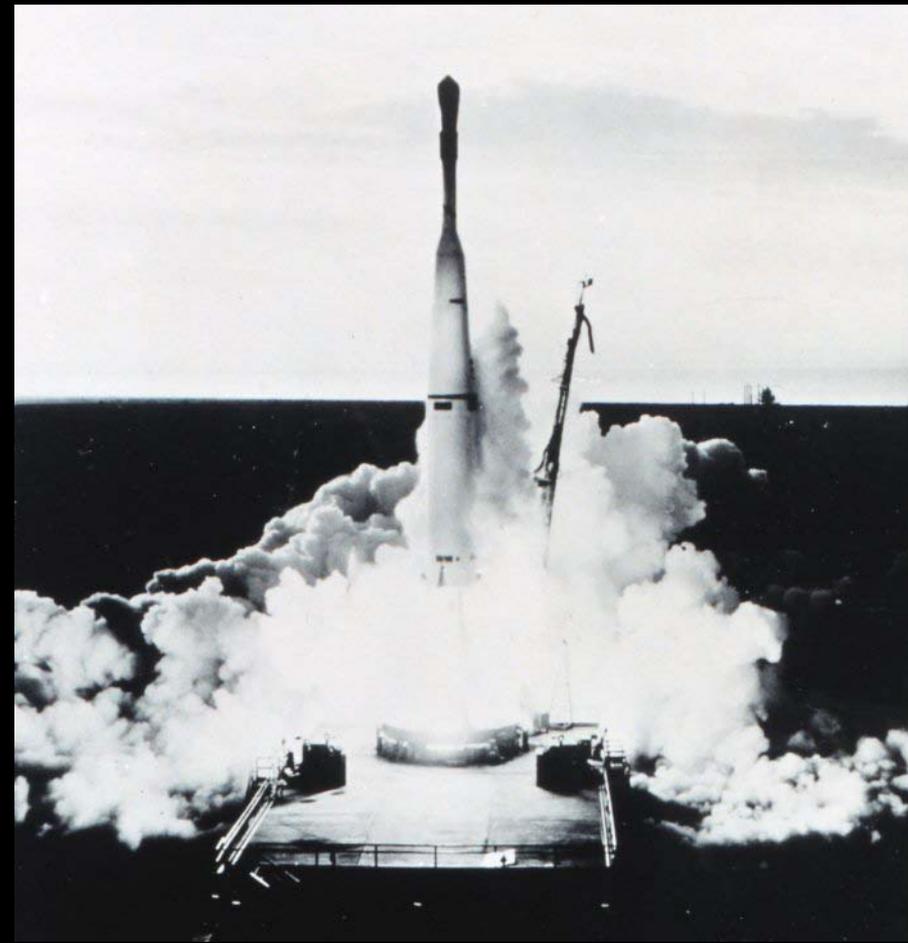


data, in support of the NOAA mission and the Nation.





- **On April 1, 1960 the first U.S. weather satellite was launched from Cape Canaveral, FL**



- **Within hours, President Eisenhower was viewing the first pictures that were sent back to ground stations**

**First TIROS-1  
Image**

**April 1, 1960**

**Canada**

**Nova Scotia**



# EVOLUTION OF THE OPERATIONAL PRODUCTS



1970

1980

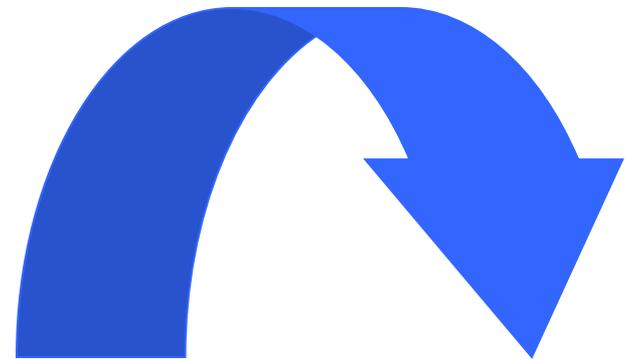
1990

2010

Soundings

Soundings

Soundings



**NPOESS**

Sea Sfc Temp

Sea Sfc Temp

Sea Sfc Temp

Snow / Ice

Snow / Ice

Snow / Ice

Imagery

Imagery

Imagery

Winds

Winds

ERB

ERB

Ozone

Ozone

Precip

Precip

Veg Index\*

Veg Index

Aerosol

Clouds

Microwave



# Environmental Data Records (EDR) Allocated by Sensors



|   |                             |
|---|-----------------------------|
| ★ | Atm Vert Moist Profile      |
| ★ | Atm Vert Temp Profile       |
| ★ | Imagery                     |
| ★ | Sea Surface Temperature     |
| ★ | Sea Surface Winds           |
| ★ | Soil Moisture               |
|   | Aerosol Optical Thickness   |
|   | Aerosol Particle Size       |
|   | Aerosol Refractive Index    |
|   | Albedo (Surface)            |
|   | Auroral Boundary            |
|   | Auroral Energy Deposition   |
|   | Auroral Imagery             |
|   | Cloud Base Height           |
|   | Cloud Cover/Layers          |
|   | Cloud Effective Part Size   |
|   | Cloud Ice Water Path        |
|   | Cloud Liquid Water          |
|   | Cloud Optical Thickness     |
|   | Cloud Particle Size/Distrib |
|   | Cloud Top Height            |

|  |                                       |
|--|---------------------------------------|
|  | Cloud Top Pressure                    |
|  | Cloud Top Temperature                 |
|  | Down LW Radiance (Sfc)                |
|  | Down SW Radiance (Sfc)                |
|  | Electric Fields                       |
|  | Electron Density Profile              |
|  | Energetic Ions                        |
|  | Geomagnetic Field                     |
|  | Ice Surface Temperature               |
|  | In-situ Plasma Fluctuation            |
|  | In-situ Plasma Temp                   |
|  | Ionospheric Scintillation             |
|  | Med Energy Chgd Parts                 |
|  | Land Surface Temp                     |
|  | Net Heat Flux                         |
|  | Net Solar Radiation (TOA)             |
|  | Neutral Density Profile               |
|  | Ocean Color/Chlorophyll               |
|  | Ocean Wave Character                  |
|  | Outgoing LW Rad (TOA)                 |
|  | O <sup>3</sup> – Total Column Profile |

|  |                            |
|--|----------------------------|
|  | Precipitable Water         |
|  | Precipitation Type/Rate    |
|  | Pressure (Surface/Profile) |
|  | Sea Ice Characterization   |
|  | Sea SFC Height/TOPO        |
|  | Snow Cover/Depth           |
|  | Solar Irradiance           |
|  | Supra-Therm-Aurora Prop    |
|  | Surface Type               |
|  | Surface Wind Stress        |
|  | Suspended Matter           |
|  | Total Water Content        |
|  | Vegatative Index           |

**LEGEND**

|           |       |
|-----------|-------|
| VIIRS     | GPSOS |
| CMIS      | ERBS  |
| CrIS/ATMS | TSIS  |
| OMPS      | ALT   |
| SES       | APS   |

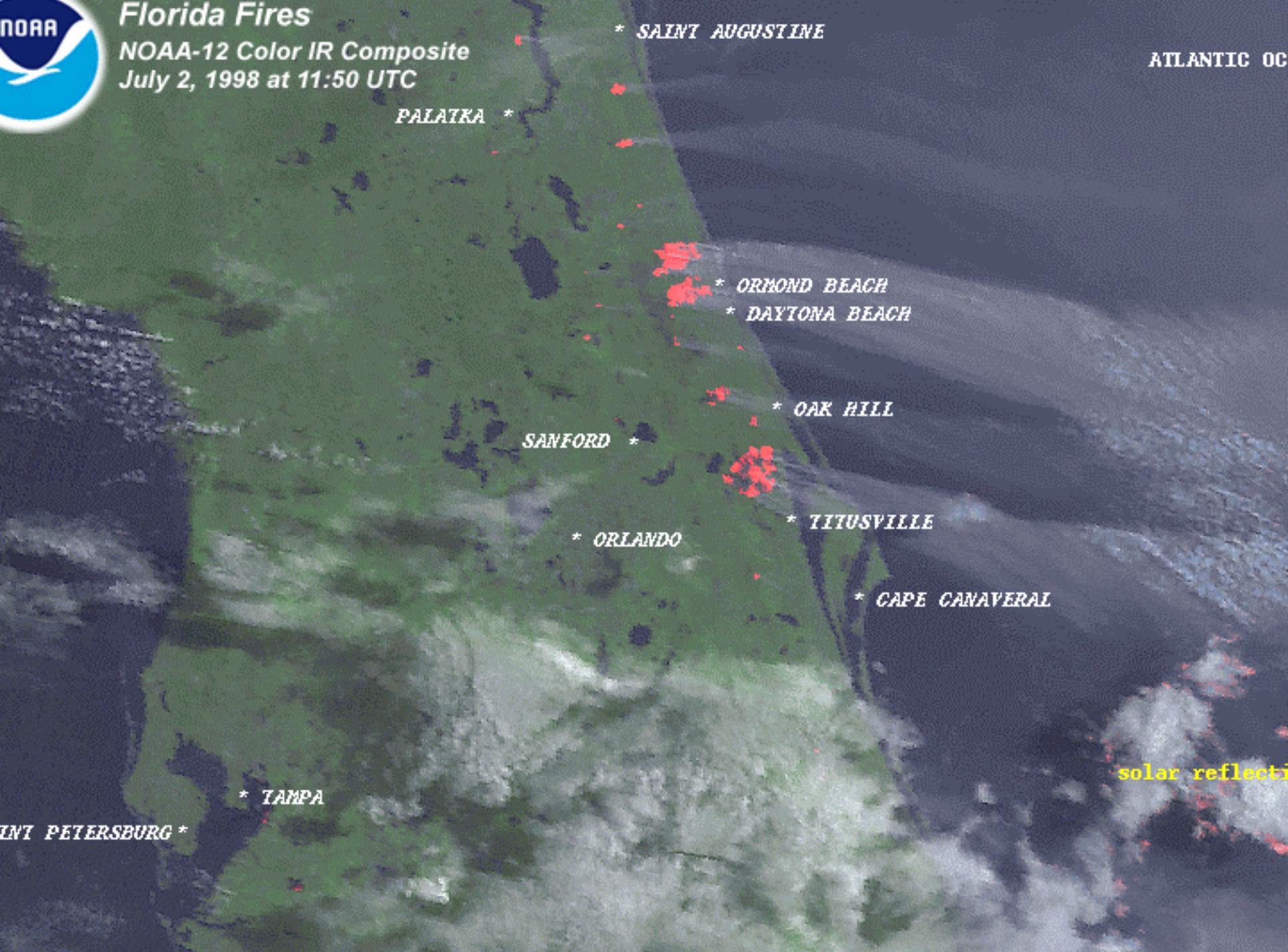
★ - KPPs



# Florida Fires

NOAA-12 Color IR Composite  
July 2, 1998 at 11:50 UTC

ATLANTIC OC



\* SAINT AUGUSTINE

PALATKA \*

\* ORMOND BEACH

\* DAYTONA BEACH

\* OAK HILL

SANFORD \*

\* TITUSVILLE

\* ORLANDO

\* CAPE CANAVERAL

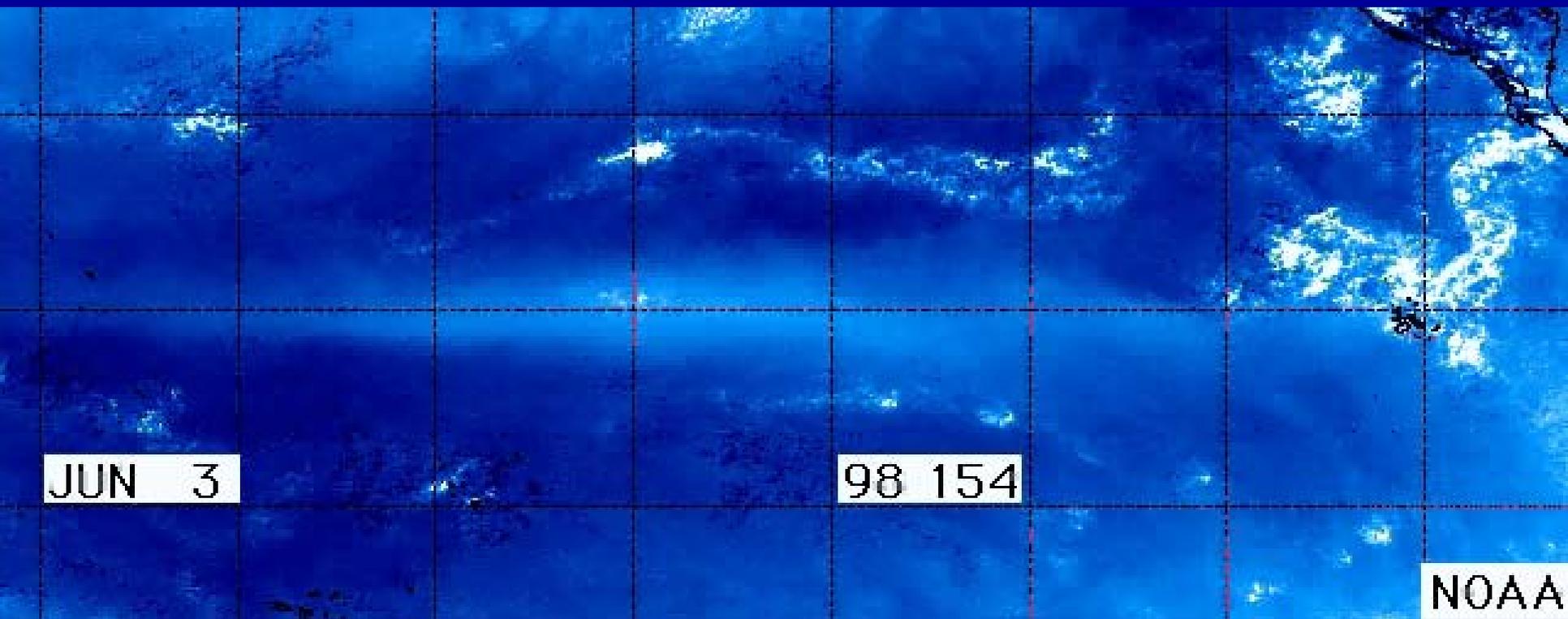
\* TAMPA

\* SAINT PETERSBURG \*

solar reflecti



# GOES- SST daily SST maximum animation reveals return of La Nina



JUN 3

98 154

NOAA

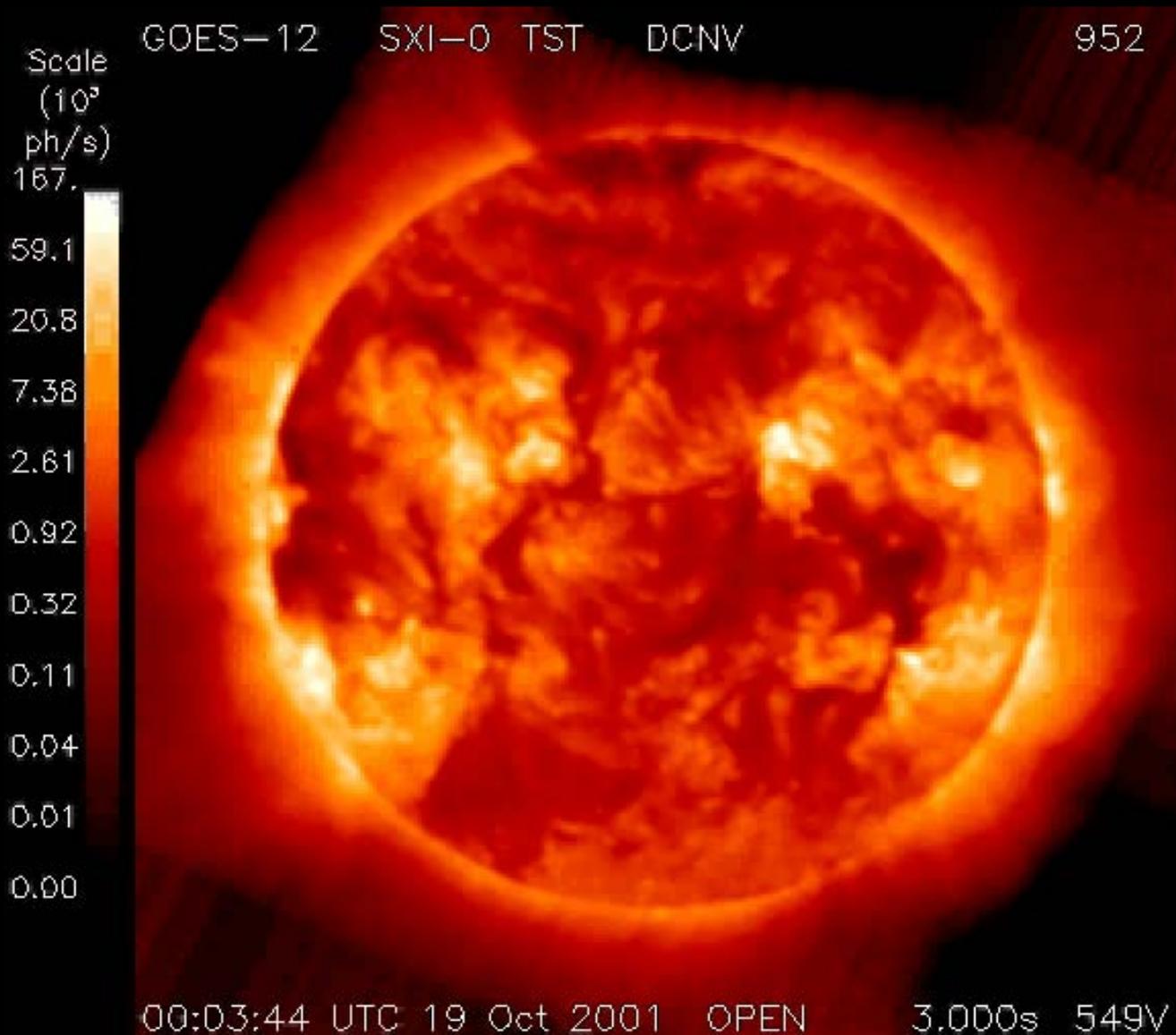


# GOES – 8 Captures Eruption of Popocatepetl Volcano January 22, 2001



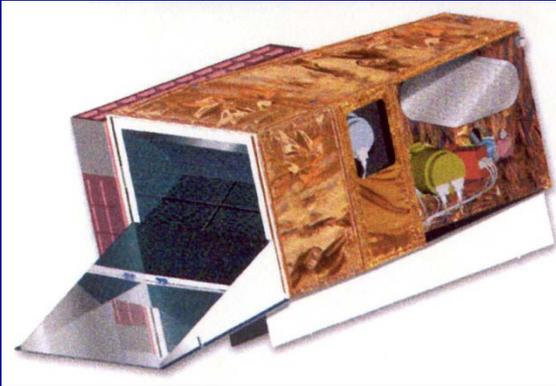
150015 G-8 IMG 01 22 JAN 01022 221500 05883 11010 00.50

# GOES-12 Solar X-ray Imager



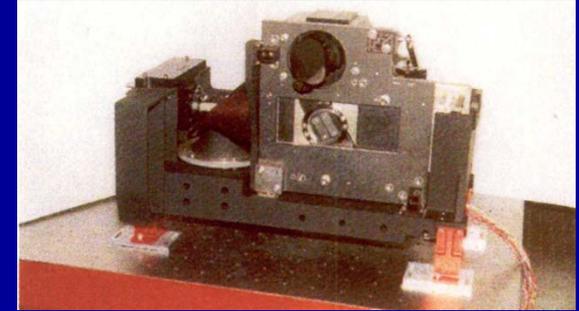


# NPOESS Instruments in Development/Production Phase



**Visible/IR Imaging Radiometer Suite (VIIRS)  
Raytheon**

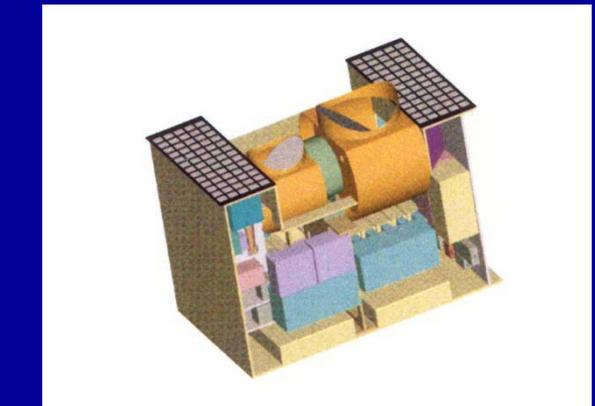
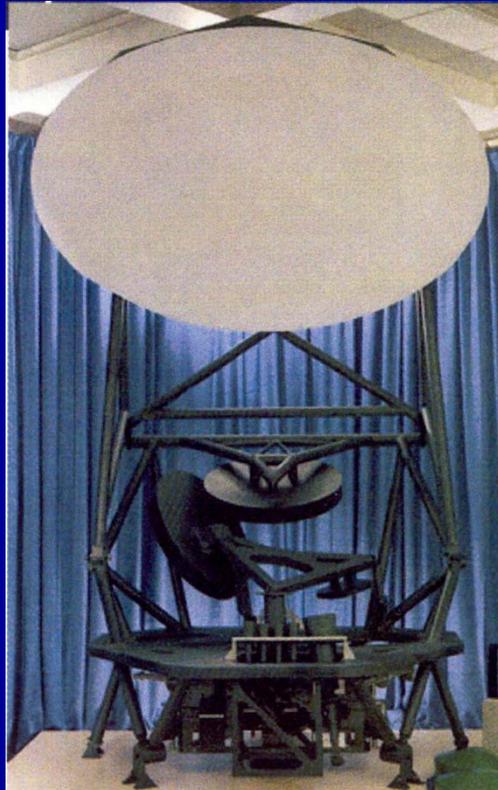
**Conically scanning  
Microwave Imager/Sounder  
(CMIS) Boeing**



**Cross-track IR Sounder (CrIS)  
[Engineering Development  
Unit] ITT**



**Ozone Mapping & Profiler  
Suite (OMPS)  
[Artist Conception] Ball**



**Advanced Technology  
Microwave Sounder (ATMS)  
[NASA/GSFC Notional  
Design] Aerojet**



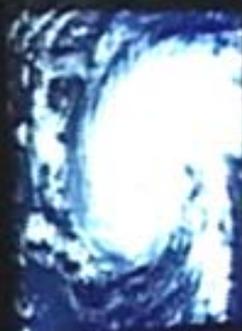


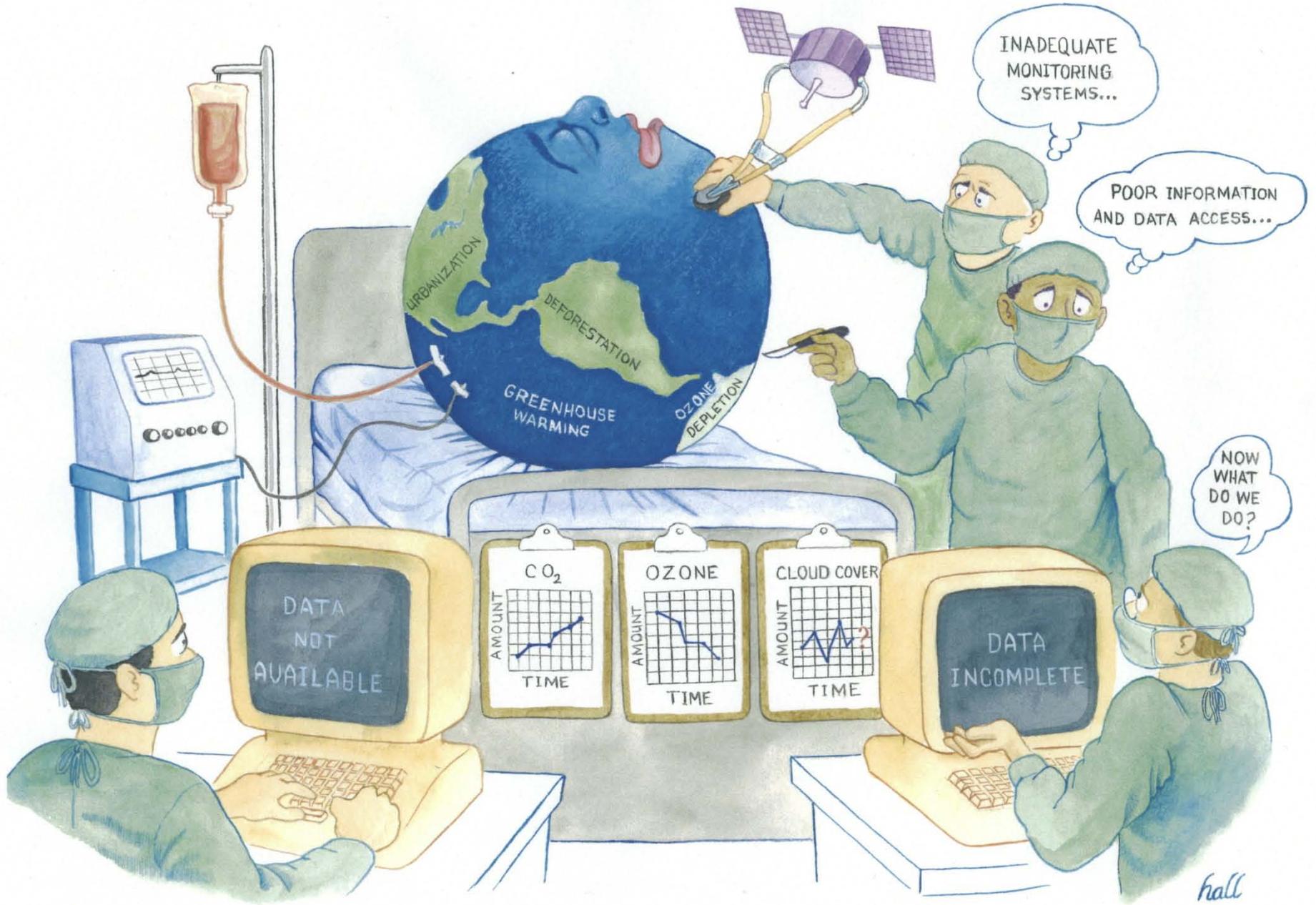
# NPOESS

National Polar-orbiting Operational  
Environmental Satellite System



## Monitoring Ozone Fluctuation



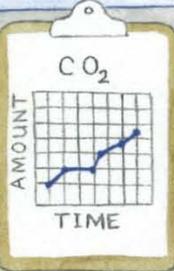


INADEQUATE  
MONITORING  
SYSTEMS...

POOR INFORMATION  
AND DATA ACCESS...

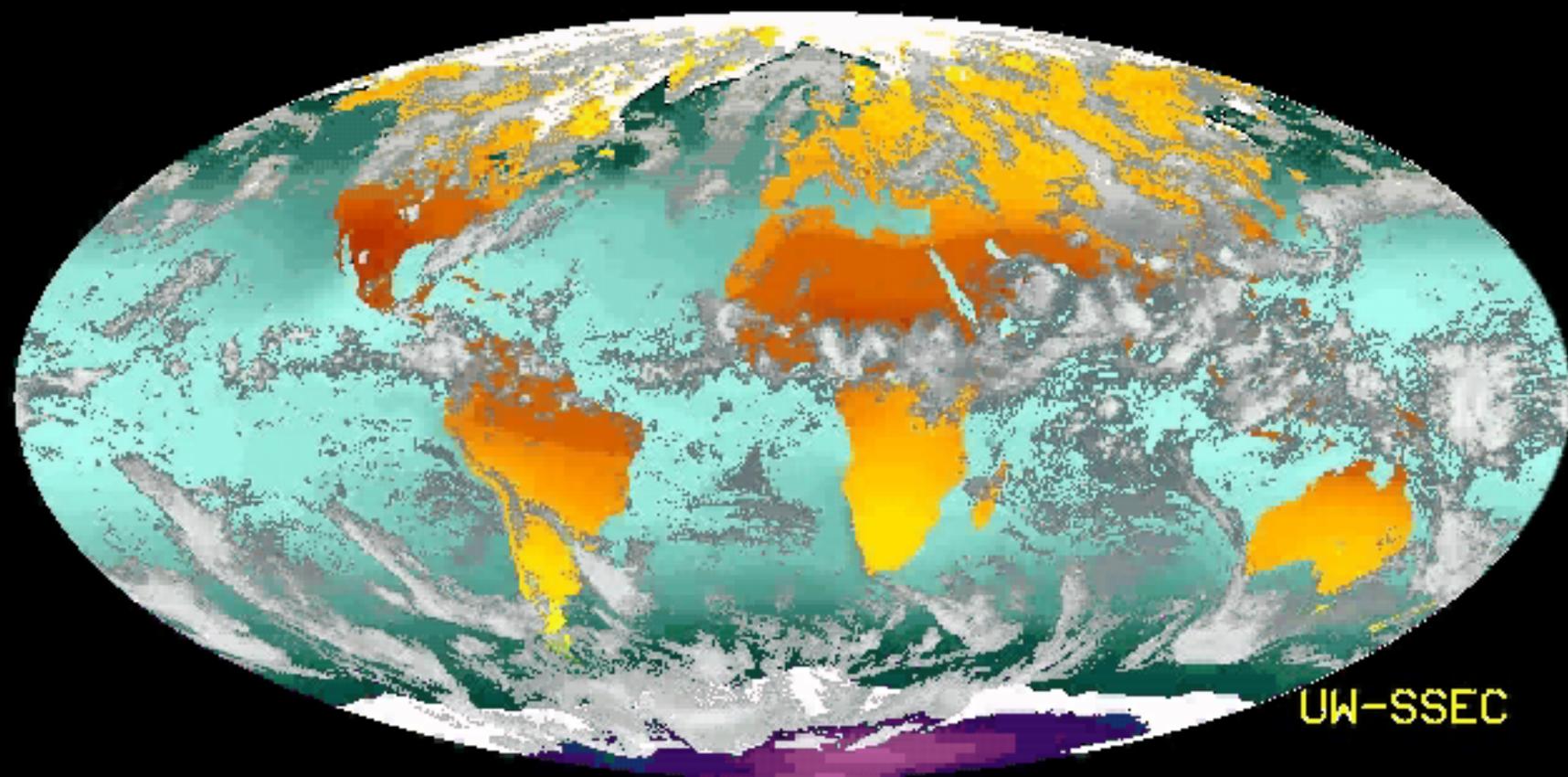
NOW  
WHAT  
DO WE  
DO?

DATA  
NOT  
AVAILABLE



DATA  
INCOMPLETE

hall



UW-SSEC

T(C) 5 15 25 -55 -25 5 35

ICE SEA SURFACE

SYNOPTIC OBS

CLOUD TOP